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PHYTOTOXICOLOGY ASSESSMENT  
SURVEY INVESTIGATION  
IN THE VICINITY OF  
CLINTAR GROUNDSKEEPING SERVICES  
17 DUNDAS ST. E., MISSISSAUGA  
JUNE 2, 1988

JANUARY 1990



Ontario

Environment  
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Jim Bradley, Minister/ministre

PHYTOTOXICOLOGY ASSESSMENT SURVEY INVESTIGATION  
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PHYTOTOXICOLOGY ASSESSMENT SURVEY INVESTIGATION IN THE  
VICINITY OF CLINTAR GROUNDSKEEPING SERVICES, 17 DUNDAS ST.E.,  
MISSISSAUGA - JUNE 2, 1988.

On June 2, 1988, the writer visited the Clintar property, Mississauga, to determine the cause of decline of mature maple trees at the north property limit. The investigation was requested by Mr. A. Nemet, MOE, Oakville. Mr. Nemet reported that a salt pile had been stored on the Clintar property in the general area of the declining trees during the 1987-88 winter and he suspected that the tree decline was related. The salt had been piled directly on the ground in the general area of the W limit/NW corner of the Clintar property.

**OBSERVATIONS**

Prior to the investigation, the above noted salt storage pile had been removed from the Clintar property. During the salt removal operation, a shallow layer of surface soil also had been removed throughout much of the area at rear of the Clintar building. In the former salt pile area, the exposed clay soil was hardpacked and barren and a whitish salt-like surface material was present in some areas.

The observations further revealed that three Norway maple trees to the neighbouring north of the former salt pile area were in various stages of decline. These mature trees were abutting the Clintar north property limit, and the base of each tree was embedded in the asphalt of the neighbouring parking lot to the north. The two maples closest to the former salt pile area (NW corner of Clintar property) were in the most advanced stage of decline, with foliage being absent throughout the crown of both trees. The barren branches throughout these trees exhibited

several buds with the initial spring growth being withered and dead. The buds which did not open in the spring were dry and necrotic. The third Norway maple affected was located to the immediate east. This tree had injured foliage throughout the crown, with the most adverse foliar effects (wilting/necrosis/cupping) being observed on middle and upper branches which appeared thin. The foliage on lower positioned branches in the crown generally was chlorotic and with marginal necrosis. The observed foliar effects and pattern of decline displayed by this tree were characteristic of salt injury.

#### SAMPLES COLLECTED FOR CHEMICAL ANALYSIS

In the former salt pile area, scrapings of soil were collected at two sites (Sites 1 & 2 - see attached sketch) where the salt-like material was observed on the surface of the hard, clay soil. Surface soil also was sampled at Sites 3, 4 and 5 which were close to the E limit/NE corner. These sites were situated slightly upgrade of the former salt pile area and, to the writer's knowledge, no salt had been stored at these sites. As at Sites 1 and 2, the surface soil at Sites 3 and 4 had been previously removed to about a 15 cm depth. Site 5 had not been disturbed. In addition to the soil samples, twigs were collected from one of the leafless maples, as well as from the foliated tree to the immediate east. Control samples were collected from a healthy Norway maple tree which was situated at the east limit of the neighbouring north parking lot.

The soil and twig samples were returned to the Phytotoxicology Section for processing and were submitted, on a dry weight basis, to the Laboratory Services Branch, MOE, to be analyzed for sodium and chloride. The soil samples also were submitted for determination of electrical conductivity which reflects the total salt concentration in the soil.

## ANALYTICAL RESULTS

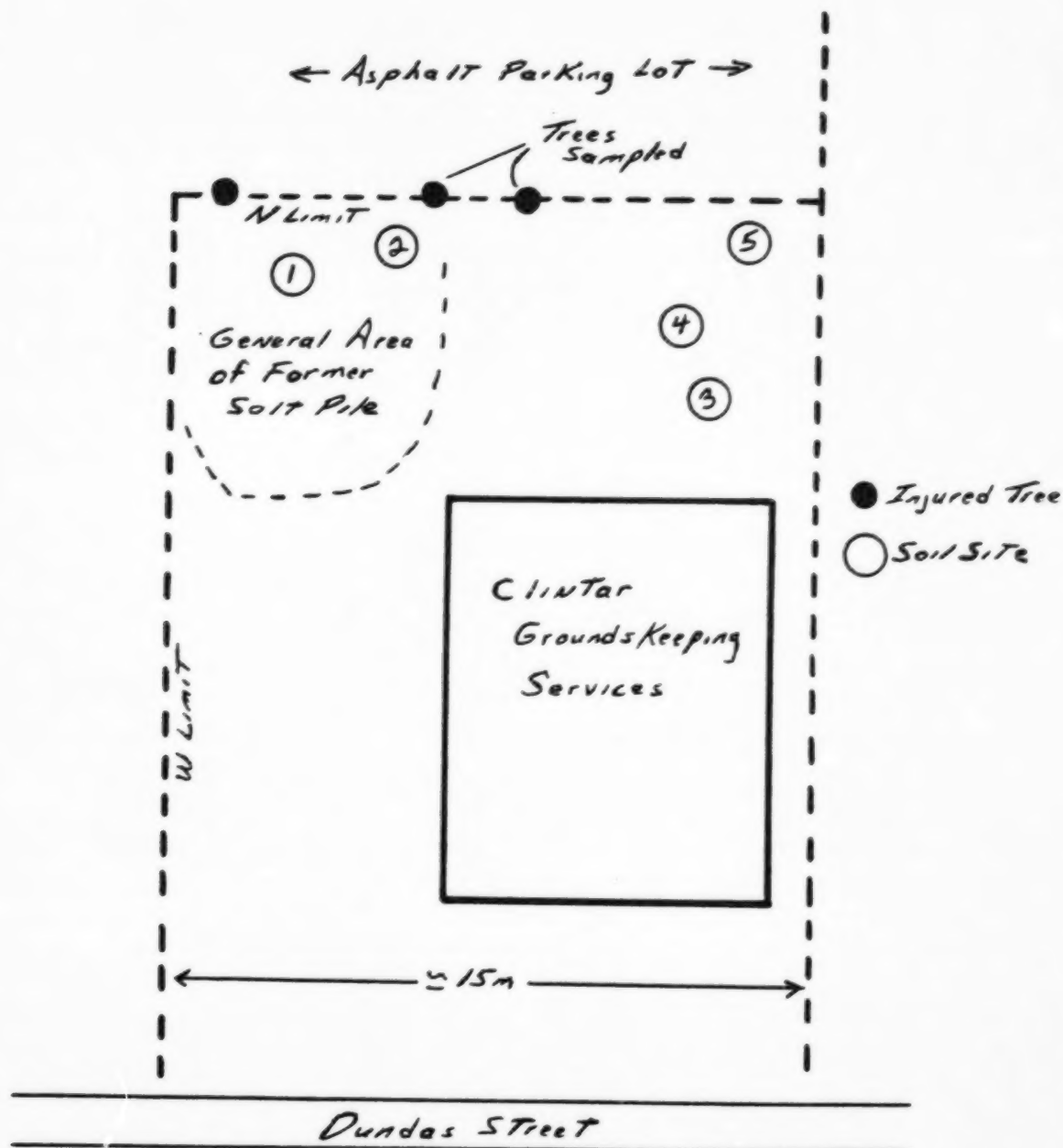
The surface soil scrapings collected in the former salt pile area (Sites 1 and 2) had excessive concentrations of total sodium (15,000 - 17,000 ppm) and water extractable chloride (30,000 - 33,000 ppm) relative to the corresponding levels found at Sites 3,4 and 5 near the east limit (see attached Table 1). The electrical conductivity of the surface soil sampled at Sites 1 and 2 also was found to be high (1,057 - 6,160 micromhos/cm), a further indication that the surface soil collected in the former salt storage area (Clintar NW corner) was contaminated with salt.

The fact that the twigs sampled from the injured maple trees, which neighboured the Clintar NW corner, also contained abnormally high levels of sodium (1,700 - 2,500 ppm) and chloride (4,300 - 11,000 ppm), further implicates salt as being the cause of the tree decline (see Table 2).

## SUMMARY

In summary, the investigation findings revealed that the death and decline of the mature Norway maple trees abutting the N limit/NW corner of the Clintar property had been caused by soil salt contamination. The data indicated that the primary source was the former pile of deicing salt which had been stored at the Clintar NW corner/W limit during the 1988 winter. Although the salt storage pile had been removed from the Clintar property prior to the investigation, the underlying soil was left in a contaminated condition.

Sketch Map: Approximate Location of Injured Maple Trees and of Soil Collection Sites Relative to the Former Salt Pile on the Clintar Property.



NOT TO SCALE

Table 1  
Analytical Results for Surface Soil (0-2 cm)  
Collected on the Clintar Property - June 2, 1988.

| Site | Concentration - ppm, dry wt. |           | Electrical<br>Conductivity -<br>Micromhos/cm<br>(2:1 water:<br>soil suspension) |
|------|------------------------------|-----------|---------------------------------------------------------------------------------|
|      | Sodium                       | Chloride* |                                                                                 |
| 1**  | 17,000                       | 33,000    | 1,057                                                                           |
| 2**  | 15,000                       | 30,000    | 6,160                                                                           |
| 3    | 200                          | 66        | 180                                                                             |
| 4    | 220                          | 270       | 118                                                                             |
| 5    | 260                          | 36        | 46                                                                              |

\* Water extractable level

\*\* Sites 1 & 2 were located in former salt pile area

Note: Soil conductivity levels (2:1 water: soil suspension)  
> 500 micromhos/cm may harm sensitive plants.

Table 2  
Sodium and Chloride Concentrations Detected in the  
Injured and Healthy Norway Maple Twigs Sampled in the  
Vicinity of the Clintar N Property Limit  
- June 2, 1988.

| Maple Trees Sampled               | Twig Concentration (ppm, dry wt. basis) |          |
|-----------------------------------|-----------------------------------------|----------|
|                                   | Sodium                                  | Chloride |
| Injured tree with barren branches | 2,500                                   | 11,000   |
| Injured tree with injured foliage | 1,700                                   | 4,300    |
| Healthy tree                      | 150                                     | 500      |